

# Floor Forward Thinking



**M**anufacturers have been working to develop more environmentally friendly building materials from the ground up. Recently, a new alternative to vinyl flooring called Stratica entered the market. Manufactured by Amtico Company, based in Coventry, United Kingdom, Stratica is made from high-tech synthetic copolymer resins and boasts not only high performance and durability but also low environmental impact.

## Flooring 101

When selecting a type of flooring, consumers have many choices of natural and synthetic materials. Natural materials include stone, marble, wood, cork, bamboo, and linoleum (vinyl flooring is often referred to as linoleum, but true linoleum is made from natural materials including linseed oil and cork). Environmental groups generally advocate the use of natural materials in building. However, such materials tend to be more expensive than synthetic options, and they can be difficult to maintain. For example, hardwood floors can be scratched easily, and linoleum sometimes emits unpleasant odors caused by the oxidation of fatty acids.

This century has seen an outpouring of synthetic flooring that mimics the appearance of natural materials. Vinyl flooring, in

particular, provides an inexpensive option to home and building owners and offers durability and ease of cleaning. However, many environmental and health groups have expressed concerns about the health risks posed by the chemicals used in the manufacture and installation of synthetic flooring, especially vinyl flooring. These groups are particularly concerned about the effects of exposure to such chemicals on children's health because infants and toddlers spend much of their time on the floor and their developing bodies may be at greater risk of harm.

## Problems with PVCs

From its creation to its disposal, there are environmental and health problems associated with polyvinyl chloride (PVC), which is the major component of vinyl flooring. The production of PVC creates toxic waste that must be dumped or incinerated. Because dioxin and dioxin-like compounds are unintentionally created whenever chlorine-based chemicals are produced, used or burned, PVC's heavy chlorine content results in the release of dioxins into the environment during manufacturing. While no causal relationships have been established, dioxin exposure has been linked to cancer, reproductive dysfunction, endocrine disruption, and immune suppression. One

particular dioxin, 2,3,7,8-tetrachlorodibenzo-*p*-dioxin, is classified as a human carcinogen by the International Agency for Research on Cancer. Because very little PVC is recycled after use, the waste material must also be landfilled or burned, thus releasing more dioxin into the environment.

Although the presence of PVC in products does not appear to directly affect health, additives that are commonly used in such products have been linked with adverse health effects. For example, phthalates, which are added to PVC for flexibility, were shown in the 1960s to migrate out of PVC. Studies conducted by the Department of Health and Human Services' National Toxicology Program have linked phthalates to a variety of health problems, including damage to the liver, kidney, and reproductive system. The widely used di(2-ethylhexyl) phthalate is listed as a possible human carcinogen by the International Agency for Research on Cancer.

A study published in the February 1999 issue of the *American Journal of Public Health* linked PVC flooring with asthma symptoms in children. Researchers at the National Institute of Public Health in Oslo, Norway, compared the living environment of 251 infants and toddlers diagnosed with bronchial obstruction to that of a control group of 251 healthy children.



They concluded that a child's risk of bronchial obstruction was related to the presence of PVC flooring in the home. They found that children who encountered PVC flooring in nurseries, bedrooms, and other rooms had an 89% higher risk of bronchial obstruction than children in homes free of PVC flooring and wall coverings. The authors say that the proximity of a child's breathing zone to the floor could explain the risk. There is much controversy about the amount of chemicals that migrate out of PVC products, however, and whether or not that amount is dangerous to human health remains to be seen.

### A Greener Option

Stratica, which offers the durability of vinyl without potential environmental effects, appears to be one of the first viable alternatives to vinyl flooring. The flooring was specifically designed for large, high-traffic commercial areas and is already in use in ships, shopping centers, and airports around the world. Stratica offers the convenience of vinyl flooring and is easy to install.

Stratica comes in a variety of patterns that mimic natural flooring, including solids, marbles, granites, stones, terrazzos, and woods. A review of Stratica in the November 1998 issue of *Environmental Building News* stated, "The simulated wood and stone prints are so convincing that real wood and stone flooring may also be threatened by this new competitor." Although Stratica is priced slightly higher than high-end vinyl flooring, Susanne Voss, direct marketing manager for the Atlanta, Georgia-based Amtico International, which represents Stratica in the United States, says the product will save money in the long run. "Though the initial cost is higher, the cost savings in installation and maintenance over the long term result in significant overall cost savings," she says.

Stratica consists of two layers of polymers. The bottom layer is made from ethylene copolymers, which are a type of polyethylene. This layer also includes chalk and clay as filler materials. The top layer consists of Surlyn, an ionomer coating made by DuPont that is created from ethylene/methacrylic acid copolymers. This is the same coating used on golf balls, which Amtico says is indicative of its durability. Stratica is completely chlorine-free. No additives such as plasticizers are necessary because the material is inherently flexible. A solvent-free adhesive is used in installation.

Amtico says the flooring is scuff-resistant and that in abrasion tests, it performed 40 times better than marble, 30 times better than terrazzo, 10 times better than linoleum, and twice as well as quality vinyl

tiles and laminates. Stratica is also highly resistant to chemical staining. As for accidental burning, Amtico says the flooring has low flammability, smoke density, and toxicity.

Greenpeace considers Stratica's major component, polyethylene, to be one of the safest plastics for the environment. In a 24 April 1998 report, *PVC Plastic: A Looming Waste Crisis*, Greenpeace ranked the most commonly used types of plastic in order of environmental and human health problems related to production, additives, emissions, disposal, and fires. The lower the placement on the list, the less harmful the plastic is for the environment. PVC ranked at the top and biobased polymers, which are biodegradable plastics made from renewable sources, were at the bottom. Polyethylene was ranked as the next best thing to biobased plastics.

According to the report, polyethylene is versatile, inexpensive, and can be used to replace almost all PVC applications. Compared to PVC, polyethylene uses fewer problematic additives and has a reduced leaching potential in landfills, a reduced risk of dioxin formation when burning, and a higher potential for recycling.

Another environmental advantage of Stratica is that it does not contribute to the



Amtico Company, Ltd.

**Getting healthy underfoot.** Stratica's high durability and environmental friendliness make it a good choice for a variety of commercial locations including banks, stores, and airports.

problem of indoor air pollution because it emits no volatile organic compounds (VOCs). According to the U.S. Environmental Protection Agency, some VOCs cause immediate health effects such as eye and respiratory tract irritation, headaches, dizziness, and visual disorders, and some are known or suspected to cause cancer in humans. Furthermore, because Stratica's top layer is made of the durable Surlyn, it does not require the use of products such as waxes or chemical-based cleaners, many of which emit VOCs at high rates themselves.

According to *Environmental Building News*, the Fraunhofer Institute in

### Suggested Reading

- Carroll WF, et al. Characterization of dioxins and furans from ethylene dichloride, vinyl chloride and polyvinyl chloride facilities in the United States. Resin, treated wastewater and ethylene dichloride. *Organohalogenes* 27:62-67 (1996).
- Carroll W. Is PVC in house fires the great unknown source of dioxin? Washington, DC: The Vinyl Institute, 1995.
- Reisch M. Plastics in building and construction. *Chem Eng News* 72:20 (1994).
- Stringer R, Costner P, Johnston P. PVC manufacture as a source of PCDD/Fs. *Organohalogen Compounds* 24:119-123 (1995).



Germany compared the life cycle of Stratica to that of vinyl flooring. The study found that the production of Stratica requires 30% less energy and 29% less water than the production of vinyl, resulting in 33% less contribution to global warming. Voss says these reduced numbers are due to the fact that the manufacture of Stratica requires less steam than the production of vinyl.

Although Stratica has less impact on the environment than vinyl flooring, Lisa Finaldi, the PVC campaign coordinator for Greenpeace, points out that it is made from petroleum, a nonrenewable resource. "While we recognize that things like Stratica are a step forward, it's not [part of] the ultimate solution," Finaldi says.

Greenpeace's goal, she says, is for manufacturers to generate products that are "made from renewable resources that are repairable and recyclable, where we don't end up with huge amounts of waste that have to be incinerated or landfilled."

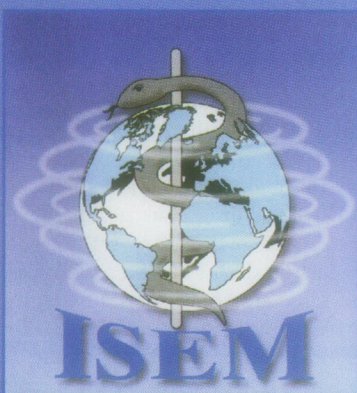
All manufacturing and cutting waste of Stratica is reused by Amtico, and the company says the flooring can be recycled after use. Voss says the flooring is guaranteed for 10 years; however, since the product is new, the company has not yet focused on the logistics of how the flooring will be recycled.

Amtico has received recognition for its environmental performance. It is one of the few companies to be certified under ISO 14001, a set of international standards for

an environmental management system. ISO 14001 was developed by the International Organization for Standardization, a nongovernmental organization that promotes the development of global standardization to facilitate the international exchange of goods and services. Stratica is one of the first flooring products to be manufactured within ISO Standard 14001 certification. The development of such products suggests that manufacturers are moving closer to creating a more environmentally friendly marketplace.

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## INTERNATIONAL MULTIDISCIPLINARY CONFERENCE ON ENVIRONMENTAL MEDICINE



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Conference Organizers:  
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### Objectives

This conference will provide a forum for experts from different fields to identify and discuss problems of environmental medicine from a multidisciplinary angle. One special theme of the conference will be the diagnosis and description of environmental diseases as well as their prevention and therapeutic approaches. The conference will provide theoretical knowledge as well as the opportunity during the workshops to seek ways and means to implement this knowledge from experienced professionals.